

Docket: 8071-188T (OPP030864US)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Dae-Ho CHOO, et al.

Examiner: Timothy L. Rude

Serial No.: 10/602,054

Group Art Unit: 2871

Filed: June 24, 2003

Docket: 8071-188T (OPP030864US)

For: **IN-LINE SYSTEM AND METHOD FOR MANUFACTURING LIQUID CRYSTAL DISPLAY**

Mail Stop: Appeal Brief-Patents
Commissioner for Patents

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APPEAL BRIEF

Sir:

In response to the Final Office Action dated February 20, 2009 rejecting claims 57, 58 and 60-65 under 35 U.S.C. § 103 (a), Applicants appeal pursuant to the Notice of Appeal dated April 9, 2009, and respectfully submits this appeal brief.

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1. REAL PARTY IN INTEREST

The real party in interest is Samsung Electronics Co., Ltd, by virtue of assignment dated March 28, 2001 and recorded July 16, 2001 in the United States Patent and Trademark Office at reel 011988 and frame 0300. The above assignment is for U.S. Patent Application Serial No. 09/838,385, filed April 20, 2001, now issued as U.S. Patent No. 6,657,701, of which the present application serial no. 10/602,054, filed June 24, 2003 is a divisional. Pursuant to MPEP 306, the assignment of an application carries over to a continuation or a divisional of that application.

2. RELATED APPEALS AND INTERFERENCES

The following related and commonly assigned U.S. patent application is under appeal:

- a) U.S. Patent Application Serial No. 10/878,395 is currently under appeal and a Request for Rehearing was filed on April 9, 2009.

3. STATUS OF THE CLAIMS

Claims 57-77 are pending. Claims 59 and 66-77 have been withdrawn. Claims 1-56 and 61 have been canceled. Claims 57, 58, and 60-65 stand rejected and are under appeal. A copy of the claims under appeal is presented in the Claims Appendix attached herewith. Applicants wish to point out that the rejection to claim 61 by the Examiner was in error because this claim was already canceled by Applicants in their response filed on December 1, 2008 with the United States Patent and Trademark Office.

4. STATUS OF THE AMENDMENTS

No amendments were made after Final Rejection.

5. SUMMARY OF CLAIMED SUBJECT MATTER

It is to be understood that the following description of the claimed subject matter and references to the specification and drawings are for illustrative purposes only to provide some context for the claimed subject matter, but shall not be construed as placing any limitations thereon or limiting the scope thereof.

An in-line system for manufacturing liquid crystal displays is provided. As set forth in claim 57, an in-line system for manufacturing liquid crystal displays comprises a first loading unit (See, e.g., Application at page 6, lines 7-8 and Figure 3 at reference numerals 1000); a substrate-combination unit operatively connected to the first load unit, the substrate-combination unit adapted to receive a first substrate from the first load unit and adapted to receive a second substrate having at least one of a sealant and a liquid crystal material deposited thereon (See, e.g., Application at pages 10, line 21-page 11, line 2 and Figure 3 at reference numerals 110, 120, 1000 and 6000); an in-line convey unit (See, e.g., Application at pages 6, line 15 and Figure 3 at reference numerals 1110, 1120, 1130, 1140, 1150, 1170 and 1180); and a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state (See, e.g., Application at pages 11, lines 3-6 and Figure 3 at reference numerals 110, 120, 1170, 6000 and 8000), wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant (See, e.g., Application at pages 11, lines 7-20 and Figure 3 at reference numerals 110, 120, 8000, 8100 and 8200).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- A. Claim 57 has been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,978,065 to Kawasumi et al. (“the Kawasumi patent”) in view of Japanese Patent Application Publication No. JP 56114928 to Adachi (“the Adachi publication”) and U.S. Patent No. 6,222,603 to Sakai et al. (“the Sakai patent”).

B. Claims 58 and 60 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai as applied to claim 57 above, and further in view of U.S. Patent No. 2,394,293 to Deem (“the Deem patent”).

C. Claims 61-65 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai, and further in view of U.S. Patent No. 5,731,860 to Harada et al. (“the Harada patent”).

7. ARGUMENTS

A. **Claim 57 has been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,978,065 to Kawasumi et al. (“the Kawasumi patent”) in view of Japanese Patent Application Publication No. JP 56114928 to Adachi (“the Adachi publication”) and U.S. Patent No. 6,222,603 to Sakai et al. (“the Sakai patent”).**

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference teaching. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Finally, the prior art reference must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the art and not based on applicant’s disclosure. If an independent claim is non-obvious under section 103, then any claim depending therefrom is non-obvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

The references of Kawasumi, Adachi , Sakai, cited by the Examiner, taken individually or in combination are legally insufficient for establishing a prima facie case of obviousness against claim 57. Moreover, the references of Kawasumi, Adachi , Sakai, Deem cited by the Examiner, taken individually or in combination are legally insufficient for establishing a prima facie case of obviousness against claim 58 and 60. In addition, the references of Kawasumi,

Adachi , Sakai, Harada cited by the Examiner, taken individually or in combination are legally insufficient for establishing a *prima facie* case of obviousness against claim 62-65. Therefore, the rejections under 35 U.S.C. § 103(a) of independent claim 57 and dependent claims 58, 60 and 62-65 should be reversed.

(i) Kawasumi in view of Adachi and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes " a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant", as required by claim 57.

Claim 57, recites, *inter alia*, " an in-line system for manufacturing liquid crystal displays comprising: a first loading unit; a substrate-combination unit operatively connected to the first load unit, the substrate-combination unit adapted to receive a first substrate from the first load unit and adapted to receive a second substrate having at least one of a sealant and a liquid crystal material deposited thereon; an in-line convey unit; and a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant. (emphasis added).

In particular, as conceded by the Examiner on pages 5-6 of the Final Office Action dated February 20, 2009, the combination of the Kawasumi patent and the Adachi publication at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-attaching unit having a substrate-attaching vacuum chamber which includes a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other and an exposure unit hardening the sealant, as required by claim 57.

The Examiner attempts to cure the above-mentioned deficiencies of the Kawasumi and Adachi references by citing the Sakai reference in the Final Office Action dated February 20, 2009. (**See page 6 of the Final Office Action dated February 20, 2009.**) The Examiner contends that it would have been obvious to one skilled in the art to modify the LCD system of Kawasumi and Adachi with the substrate attaching unit described in the Sakai reference. (**See page 7 of the Final Office Action dated February 20, 2009.**)

However, it is respectfully submitted that the Examiner cannot modify the Kawasumi and Adachi references in the manner set forth in the Final Office Action dated February 20, 2009 to include the teachings of the Sakai reference because at the very least the Kawasumi reference teaches away from the Examiner's proposed modification. Thus, the Examiner erred in combining the Kawasumi, Adachi and Sakai references in the manner set forth in the Final Office Action dated February 20, 2009 as discussed below and therefore the above rejections to claim 57 are defective.

In the February 20, 2009 Final Office Action, the Examiner maintains that

“The base reference may teach away ; it is the secondary reference that may not teach away. Also, Kawasumi does not teach away. It merely says that one may perform the method without vacuum [“not necessary to use an expensive vacuum apparatus” col. 7, lines 1-15].”

See Final Office Action dated February 20, 2009, page 11.

In this regard it is noted that it appears that the Examiner has misinterpreted the teachings of the Kawasumi reference and also misinterpreted the patent law regarding obviousness/teaching away.

It is well known under the U.S. patent laws that it is improper to combine references where the references teach away from their combination. (**See MPEP 2145, paragraph D**). Moreover, teaching away may be found when a reference criticizes, discredits, or otherwise discourages the solution claimed. (**See MPEP 2142.01, paragraph VI**).

The Examiner's position seems to be in the Final Office Action dated February 20, 2009 that Kawasumi teaches that one *may* utilize it's methods without using costly vacuum conditions but that the Kawasumi does *not* state his method must be done without costly vacuum conditions and thus according to the Examiner, the Kawasumi reference does not teach away from using vacuum conditions. (See pages 2 and 3 of the Final Office Action dated February 20, 2009).

However, the above position by the Examiner is erroneous because the Examiner appears to be missing the point regarding the teachings of the Kawasumi in that Kawasumi is actually teaching replacing those apparatuses which utilize vacuum conditions with its apparatus which do not utilize vacuum conditions. In particular, the Kawasumi reference states in its disclosure what it perceives to be disadvantages and problems associated with using vacuum conditions (e.g. long manufacturing times and costly manufacturing costs.) , thereby having the effect of discrediting the use of vacuum conditions and discouraging one skilled in the art from using these conditions. (See Col. 1, lines 26-50 and Col. 7, lines 4-7 of the Kawasumi patent). Also, none of the embodiments described in Kawasumi use vacuum conditions. Moreover, Kawasumi also discusses how vacuum conditions are not needed or desired. (See Col. 1, lines 26-50 and Col. 7, lines 4-7 of the Kawasumi patent).

In sum, as Kawasumi describes it's apparatuses as a replacement for and which overcomes the disadvantages and problems associated with equipment which utilize vacuum conditions for LCD manufacture, the Kawasumi reference thus clearly teaches away from the use of vacuum conditions. Consequently, for at least the reasons set forth above, one skilled in the would be lead away/discouraged by the disclosure of the Kawasumi reference from applying the teachings of the Sakai reference with regard to vacuum conditions to modify the apparatus of Kawasumi and Adachi.

Therefore, for at least the reasons set forth above, the Examiner erred in combining Kawasumi and Adachi with the Sakai reference in the Final Office Action dated February 20, 2009 and thus the above rejections to claim 57 are defective. Accordingly, the above rejection to claim 57 under 35 U.S.C. §103(a) should be reversed.

(ii) Kawasumi in view of Adachi and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes “ a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant,” as required by claim 57.

As noted above, the Kawasumi, Adachi and Sakai references are not combinable in the manner proposed by the Examiner in the Final Office Action dated February 20, 2009.

However, even assuming arguendo, that the Kawasumi, Adachi and Sakai references were combinable, this combination would still fail to teach or suggest all of the features recited in claim 57 as explained below.

Claim 57, recites, *inter alia*, “ an in-line system for manufacturing liquid crystal displays comprising: a first loading unit; a substrate-combination unit operatively connected to the first load unit, the substrate-combination unit adapted to receive a first substrate from the first load unit and adapted to receive a second substrate having at least one of a sealant and a liquid crystal material deposited thereon; an in-line convey unit; and a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant. (emphasis added).

As set forth above, claim 57 requires a first loading unit, a substrate combination unit, a convey unit, a substrate attaching unit having a vacuum chamber which includes a first compression plate 8100 and a second compression plate 8200 and an exposure unit to conjoin the substrates in a vacuum state as part of an in-line system for manufacturing liquid crystal displays. For example, an exemplary embodiment within the scope of claim 57 which illustrates a first

loading unit 1000, a substrate combination unit 6000, a convey unit 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, a substrate attaching unit 8000 having a vacuum chamber which includes a first compression plate 8100 and a second compression plate 8200 and an exposure unit to conjoin the substrates in a vacuum state as part of an in-line system for manufacturing liquid crystal displays can be found, for example, **on pages 6, 10 and 11 and Fig. 3 of the present application.**

In contrast, at the very least, none of the references of Kawasumi, Adachi and Sakai teach or suggest a substrate combination unit and a substrate attaching unit having a vacuum chamber which includes a first compression plate and a second compression plate and an exposure unit together in an in-line system as required by claim 57. In claim 57, the substrate combination unit 6000 and substrate attachment unit 8000 are not the same elements but rather are separate elements operatively connected (via the in-line convey unit 1170) to each other within the in-line system. However, Kawasumi and Adachi each at the very least clearly fail to teach or suggest either one of the substrate combination unit 6000 and/or the substrate attaching unit 8000 having the vacuum chamber which includes a first compression plate 8100 and a second compression plate 8200 and an exposure unit recited in claim 57.

Moreover, the Examiner on page 6 of the Final Office Action dated February 20, 2009 appears to state that vacuum chamber 8 having an upperside surface plate 9 and lowerside surface plate 10 corresponds to the substrate attaching unit of the present invention. It is noted that while the Sakai reference may disclose **at col. 6, line 53-Col. 7 and Fig. 3** of that reference, a vacuum chamber 8 having an upperside surface plate 9 and lowerside surface plate 10 in which a first substrate and a second substrate are conjoined, the Sakai reference at the very least is still silent regarding a substrate combination unit 6000, operatively connected (via the in-line convey unit 1170) to vacuum chamber 8 within an in-line system as required by claim 57. As mentioned above, in claim 57, the substrate combination unit 6000 and substrate attachment unit 8000 are not the same elements but rather are separate elements operatively connected (via the in-line convey unit 1170) to each other within the in-line system.

Consequently, the Sakai reference fails to cure the above-mentioned deficiencies of the Kawasumi and Adachi references. Therefore, the combination of Kawasumi in view of Adachi

and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.

In addition to the fact that the above cited references fail to teach or suggest the above-mentioned limitations recited in claim 57, the Examiner himself has also failed to even allege anywhere on the record that the cited references, including the Kawasumi, Adachi and/or Saki references teach or suggest all of the features recited in claim 57. In particular, at the very least there is no discussion or mention anywhere in the Final Office Action dated February 20, 2009 that the cited references, including the Kawasumi, Adachi and/or Saki references teaches or suggests the substrate combination unit 6000 recited in claim 57. Since the Examiner has failed to allege and factually support on the record that the cited references teach or suggest all of the features of claim 57, there is no basis for maintaining the above rejections to claim 57 under 35 U.S.C. 103(a). Accordingly, the Examiner has failed to meet his burden of establishing obviousness of claim 57 based upon the above cited references and thus the above rejections to claim 57 are defective.

In sum, the Kawasumi, Adachi and Saki references are not combinable in the manner set forth in the Final Office Action dated February 20, 2009 because the Kawasumi reference teaches away from this combination. In addition, even assuming arguendo, that the Kawasumi, Adachi and Saki references were combinable, this combination would still fail to teach or suggest all of the features recited in claim 57 for at least the reasons set forth above. Moreover, the Examiner himself has also failed to allege and factually support on the record that the cited references, including the Kawasumi, Adachi and Saki references teaches or suggests all of the features (e.g., The Final Office Action dated February 20, 2009 at the very least lacks any mention or discussion of a substrate combination unit 6000) recited in claim 57. Accordingly, for at least the reasons set forth above, the above rejections to claim 57 under 35 U.S.C. §103(a) should be reversed.

B. Claims 58 and 60 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai as applied to claim 57 above, and further in view of U.S. Patent No. 2,394,293 to Deem (“the Deem patent”).

(i) The Deem reference fails to cure the above-mentioned deficiencies of Kawasumi and Adachi references with regard to claim 57 and as claims 58 and 60 depend from claim 57, these dependent claims are likewise patentable over the combination Kawasumi in view of Adachi, Sakai and Deem for at least the same reasons as set forth above with regard to claim 57.

As noted above, claim 57 is patentable over the combination of Kawasumi in view of Adachi and Sakai. As discussed, Kawasumi, Adachi and Sakai are not combinable in the manner set forth in the Final Office Action dated February 20, 2009. In addition, even assuming arguendo that these references were combinable, the combination of Kawasumi in view of Adachi and Sakai at the very least would still fail to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.

Furthermore, the Deem patent fails to cure the above-mentioned deficiencies of the Kawasumi, Adachi and Sakai patent because the Deem patent likewise at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first

compression plate and a second compression plate; and an exposure unit hardening the sealant,
in combination with all of the other features as required by claim 57.

Thus, claim 57 is patentable over the combination of Kawasumi in view of Adachi, Sakai and Deem. Moreover, as claims 58 and 60 depend from claim 57, these dependent claims are likewise patentable over the combination of Kawasumi in view of Adachi, Sakai and Deem for at least the same reasons as set forth above with regard to claim 57.

(ii) The combination of Kawasumi in view of Adachi, Sakai and Deem clearly do not teach or suggest all of the specific features recited in either of claims 58 or 60.

In addition, to the reasons set forth above in section B(i) of this appeal brief, claims 58 and 60 are even further distinguishable over the combination of Kawasumi in view of Adachi, Sakai and Deem because the Kawasumi, Adachi, Sakai and Deem references each at the very least fail to teach or suggest all of the specific features recited in either of claims 58 or 60.

Specifically, claim 58 recites, inter-alia, “the in-line system of claim 57, wherein the substrate-attaching unit includes two or more vacuum chambers.” Next, claim 60 recites inter-alia, “the in-line system of claim 58, wherein the vacuum chambers are arranged in parallel.” For example, an exemplary embodiment within the scope of each of claims 58 and 60 which illustrates a substrate attaching unit 8000 including two or more vacuum chambers 8300-8600 arranged in parallel, a substrate attaching vacuum chamber 8700 and connecting units 1171-1174 and 1191-1194 in an in-line system can be found on, for example, **page 14, line 19-page 15, line 11 and Fig. 11 of the present application**). It is noted that the Sakai reference only discloses a vacuum chamber in which a substrate unit conjoins the first substrate and the second substrate but the combination of Kawasumi in view of Adachi, Sakai and Deem clearly do not teach or suggest the specific features of each of claims 58 and 60 including the substrate attaching unit having two or more vacuum chambers and the other above-mentioned specific features of the in-line system of claims 58 and 60.

Furthermore, it would not have been obvious to one skilled in the art to provide the specific features of each of claims 58 and 60 including the substrate attaching unit having two or more

vacuum chambers and the other above-mentioned specific features of the in-line system of claims 58 and 60 because the presently claimed invention as recited in each of claims 58 and 60 solves a long-felt need in the conventional art in connection with the production of liquid crystal displays (LCD's). As is well settled under the U.S. Patent laws, a showing of a claimed invention solving a long felt need or the failure of others in the art may rebut a showing of obviousness of that claimed invention. (See MPEP 2145). As discussed in the present application, there have been difficulties in the conventional art associated with time consuming processes and reduced productivity in the manufacture of liquid crystal display devices (LCD's). (See page 2 of the present application). However, the presently claimed invention as recited each of claims 58 and 60 overcome these difficulties associated with the conventional art by providing an in-line system which has improved productivity in connection with the manufacture of the LCD's. (See, e.g., page 15, lines 4-10 of the present application). Thus, it would not have been obvious to one skilled in the art to provide the specific features of each of claims 58 and 60 including the substrate attaching unit having two or more vacuum chambers and the other above-mentioned specific features of the in-line system of claims 58 and 60.

Therefore, for at least the reasons set forth above, withdrawal of the above rejections to claims 58 and 60 is respectfully requested.

C. Claims 61-65 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai, and further in view of U.S. Patent No. 5,731,860 to Harada et al. ("the Harada patent").

Initially, as noted above, Applicants again wish to point out the rejection to claim 61 by the Examiner was in error because this claim was already canceled by Applicants in their response filed on December 1, 2008 with the United States Patent and Trademark Office.

(i) The Harada reference fails to cure the above-deficiencies of Kawasumi and Adachi references with regard to claim 57 and as claims 62-65 depend from claim 57, these dependent claims are likewise patentable over the combination Kawasumi in view of

Adachi, Sakai and Harada for at least the same reasons as set forth above with regard to claim 57.

As noted above, claim 57 is patentable over the combination of Kawasumi in view of Adachi and Sakai. As discussed, Kawasumi, Adachi and Sakai are not combinable in the manner set forth in the Final Office Action dated February 20, 2009. In addition, even assuming arguendo that these references were combinable, the combination of Kawasumi in view of Adachi and Sakai at the very least would still fail to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.

Furthermore, the Harada patent fails to cure the above-mentioned deficiencies of the Kawasumi, Adachi and Sakai patent because the Harada patent likewise at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.

Thus, claim 57 is patentable over the combination of Kawasumi in view of Adachi, Sakai and Harada. As claims 62-65 depend from claim 57, these dependent claims are likewise patentable over the combination of Kawasumi in view of Adachi, Sakai and Harada for at least the same reasons as set forth above with regard to claim 57.

(ii) The combination of the Kawasumi, Adachi, Sakai and Harada references at the very least fails to teach or suggest all of the specific features recited in each of claims 62-65.

In addition to the reasons set forth above in section C(i) of this appeal brief, claims 62-65 are each even further distinguishable over the combination of Kawasumi in view of Adachi, Sakai and Harada because the Kawasumi, Adachi, Sakai and Harada references each at the very least fail to teach or suggest all of the specific features recited in each of claims 62-65. For example, an exemplary embodiment within the scope of claims 62-65 illustrates the vacuum holes 8900 of the first and second compression plates 8100, 8200 of the substrate attaching unit 8000 and the support tube 8800 can be found, for example, on **pages 15, lines 17- page 16, line 23 and Figs. 12, 13A-13F of the present application.** The combination of Kawasumi in view of Adachi, Sakai and Harada clearly do not teach or suggest the specific features mentioned above in connection with the vacuum holes of the first and second compression plates of the substrate attaching unit and the support tube recited in each of claims 62-65.

Thus, for at least the reasons set forth above, withdrawal of the above rejections to claims 62-65 is respectfully requested.

IV. CONCLUSION

For at least the reasons set forth above, the Examiner has failed to establish a *prima facie* case of obviousness of the presently claimed invention based upon the cited references of Kawasumi,

Adachi , Sakai, Deem, and/or Harada taken individually or in combination. Accordingly, it is respectfully requested that the Board reverse all rejections of claims 57, 58, 60 and 62-65 under 35 U.S.C. 103(a).

Respectfully submitted,



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CLAIMS APPENDIX

Claims 1-56 (Canceled)

57. (Previously presented) An in-line system for manufacturing liquid crystal displays, comprising:

a first loading unit;

a substrate-combination unit operatively connected to the first load unit, the substrate-combination unit adapted to receive a first substrate from the first load unit and adapted to receive a second substrate having at least one of a sealant and a liquid crystal material deposited thereon;

an in-line convey unit; and

a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state,

wherein the substrate-attaching unit comprises:

a substrate-attaching vacuum chamber comprising:

a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and

an exposure unit hardening the sealant.

58 .(Previously presented) The in-line system of claim 57, wherein the substrate-attaching unit includes two or more vacuum chambers.

59. (Withdrawn) The in-line system of claim 58, wherein the vacuum chambers are arranged in series.

60. (Previously presented) The in-line system of claim 58, wherein the vacuum chambers are arranged in parallel.

61. (Canceled)

62. (Previously presented) The in-line system of claim 57, wherein the substrate-attaching unit further comprises:

the first compression plate and the second compression plate having at least one vacuum hole for exhausting air from between the compression plates; and

a support tube provided between the first compression plate and the second compression plate for sealing a space therebetween, the support tube having an inner space for exhausting air to adjust an interval between the first compression plate and the second compensation plate.

63. (Previously presented) The in-line system of claim 62, wherein the substrate-attaching unit has a plurality of the vacuum holes at predetermined locations for exhausting in a predetermined sequence.

64. (Previously presented) The in-line system of claim 63, wherein the vacuum holes are formed at corners or a center portion of each side of the first compression plate and the second compression plate.

65. (Previously presented) The in-line system of claim 63, wherein the vacuum holes are slits having a predetermined length.

66. (Withdrawn) The in-line system of claim 57, further comprising a liquid crystal depositing unit for depositing the liquid crystal material on the first substrate where the sealant is deposited and a second convey unit which conveys the first substrate to the substrate-combination unit after the first substrate has been processed at the liquid crystal depositing unit.

67. (Withdrawn) The in-line system of claim 66, wherein the liquid crystal depositing unit comprises a syringe-type liquid crystal depositer for depositing the liquid crystal material at specific predetermined locations in the liquid crystal cell.

68. (Withdrawn) The in-line system of claim 66, wherein the liquid crystal depositing unit comprises is a spray type liquid crystal depositer for depositing the liquid crystal material over an entire surface of the liquid crystal cell.

69. (Withdrawn) The in-line system of claim 66, further comprising a sealant heat-treating unit forming a reaction-prevention layer on a surface of the sealant to prevent a reaction between the sealant and the liquid crystal material; and a third in-line convey unit which conveys the first substrate to the liquid crystal depositing unit after the first substrate has been processed at the sealant heat-treating unit.

70. (Withdrawn) The in-line system of claim 69, further comprising a sealant-applying unit depositing the sealant on the first substrate; and a fourth in-line convey unit which conveys the first substrate to the sealant heat-treating unit after the first substrate has been processed at the sealant-applying unit.

71. (Withdrawn) The in-line system of claim 70, wherein the sealant-applying unit deposits the sealant in closed loop without a liquid crystal injection hole.

72. (Withdrawn) The in-line system of claim 57, wherein the sealant is hardened by infrared rays.

73. (Withdrawn) The in-line system of claim 57, wherein the sealant includes one or more buffer regions to allow flow of excess liquid crystal material.

74. (Withdrawn) The in-line system of claim 70, wherein the first loading unit, the sealant-applying unit, the liquid crystal depositing unit, the substrate-combination unit, and the substrate attaching unit are arranged in series.

75. (Withdrawn) The in-line system of claim 70, further comprising a spacer-dispersing unit dispersing spacers on one of the first substrate and the second substrate.

76. (Withdrawn) The in-line system of claim 70, further comprising a spacer dispersing unit dispersing spacers on the first substrate; and a fourth in-line convey unit which conveys the first substrate to the sealant-applying unit after the first substrate is processed at the spacer-dispersing unit.

77. (Withdrawn) The in-line system of claim 59, wherein the vacuum chambers have different vacuum degrees.

EVIDENCE APPENDIX:

None

RELATED PROCEEDINGS APPENDIX:

None